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First named inventor:	Thomas Robieu
Serial No:	10/711,950
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Title:	Overload Protection Device and Machine Tool Having Such Overload Protection Device
Examiner:	Nathaniel C. Chukwurah
Art Unit:	3721

RESPONSE TO NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF
SUBMISSION OF AMENDED BRIEF

In response to the Notification dated 11/12/2008, Appellant herewith submits an amended brief in regard to claim 24 by filing replacement sections "GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL" and "ARGUMENT" to replace said sections of the appeal brief filed 3/12/2007.

It is respectfully requested that the replacement sections be entered in order to overcome the deficiencies in the appeal brief.

Respectfully submitted on December 12, 2008,

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GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1 to 5, 7 to 9, 14 and 17 are unpatentable under 35 U.S.C. 103(a) over *UK 1,095,065* in view of *Nickel et al. (US 4,635,777).*

Whether claims 18 to 20, 23, and 26 are unpatentable under 35 U.S.C. 103(a) over *Bidanset (US 3,982,616).*

Whether claim 24 is unpatentable under 35 U.S.C. 103(a) over *Bidanset (US 3,982,616)* in view of *Shultz (US,5,503,261)*.

ARGUMENT

Rejection of claims 1 to 5, 7 to 9, 14 and 17 under 35 U.S.C. 103(a) over *UK 1,095,065* in view of *Nickel et al. (US 4,635,777)*

Claim 1

The examiner argues that UK 1,095,065 discloses a portable device having overload protection and comprising a drive motor 1, drive shaft 2, and an output shaft 5 that is arranged perpendicularly to the drive shaft 1. A drive pinion is connected to the drive shaft and the drum is supported on the output shaft 5 and driven in rotation by the drive pinon. The coupling 14 is arranged between the drum 12 in the output shaft 5 and engages the drum, wherein the coupling is connected to the output shaft 5. When the output shaft is blocked, the coupling effects an automatic decoupling between drum 12 and output shaft 5 to prevent overload. The examiner further states that there is no specific teaching of the coupling being forced against the drum by centrifugal force generated by rotation of the output shaft. Examiner therefore refers to *Nickel et al.* teaching a coupling 4, 5 forced against the drum by centrifugal force generated by the rotation of the output shaft so as to engage the drum. According to the examiner, it would be obvious in view of *Nickel et al.* to modify the portable device of *UK 1,095,065* by providing a coupling forced against the drum by the centrifugal force generated by the rotation of the output shaft. The Examiner refers to col. 2, lines 59-68.

Instant claim 1 defines a portable device with overload protection device having a drum and a coupling that engages the drum under the effect of centrifugal force. A special feature is that the **drum is arranged on the drive side and is driven by the drive side (drive pinion)** of the device and the **centrifugally acting coupling is arranged on the output or driven side**, i.e., on the output shaft that supports the tool. The coupling is forced against the drum by **centrifugal force generated by rotation of the output shaft**. The coupling effects automatic decoupling between drum and output shaft upon blockage of the output shaft to prevent overload. The invention as claimed can best be understood when looking at Figs.1 and 2 and Para 75 to 78 of the specification.

Claim 1 sets forth clearly that the drum 8 is driven by the drive pinion 7 that is connected to the drive shaft 1 and the drive shaft 1 is connected to the motor 4. Therefore, when the motor is started, the drive shaft rotates and drives the pinion 7 and the pinion 7, in turn, drives the drum 8. Thus, the drum rotates but is not yet coupled to the output shaft to be able to transmit the drive torque of the motor onto the output shaft.

Claim 1 also sets forth that the **coupling is forced against the drum by centrifugal force generated by rotation of the output shaft**. It is also claimed that, when the output shaft is blocked, the coupling effects an automatic decoupling between drum and output shaft in order to prevent overloading of the drive motor.

UK 1,095,068 shows a grinding device with overload protection in which the torque transmission from motor to driven tool shaft is realized by a friction plate 14. The friction plate 14 is pressed by means of dished springs 17 against the end face of the wheel 12. When the tool is subjected to overload or is blocked, the tool spindle 5 and the friction plate 14 slip relative to the wheel 12; see page 2, lines 32-38. This overload protection is based on axial pressure applied by the springs 17 causing the plate 14 to be pressed against the wheel 12. There is no centrifugal force (centrifugal force by definition acts radially) for affecting the coupling action: only axial pressure is applied and the friction between friction surface 16 and wheel 12 generates rotational engagement. There is no drum and no coupling that is forced by centrifugal force against the drum. In particular, there are **no coupling elements provided at the driven side or tool side** which coupling elements **act under centrifugal force** on a drum provided on the drive side.

The arrangement of *UK 1,095,065* corresponds to the prior art discussed in Para 6 of the instant specification. The friction connection between drive side and driven side is permanent even in the blocking situation because the drive shaft continues to rotate. When the drive motor is not immediately switched off, the slipping movement between the plate 14 and the wheel 12 causes great friction and leads to overheating and excessive wear.

The examiner argues that it would be obvious to modify the device of *UK*

1,095,065 by employing the centrifugal clutch of *Nickel et al.* In *Nickel et al.,* coupling is effected above a predetermined minimal engine speed; see col. 2, lines 52-68. In *Nickel et al.* the clutch drum 2 is seated on the drive shaft so as to permit relative rotation thereto, i.e., when the drive shaft rotates, the drum is not rotated together with the drive shaft - there is no force transmission between the drive shaft and the drum. The drum of *Nickel et al.* is not driven by a drive pinion connected to the drive shaft. Instead, the rotor 3 of the clutch is fixedly connected to the drive shaft (see col. 2, lines 57-58). The rotor 3 has centrifugal weights 4, 5. When the motor is started and the drive shaft begins to rotate, the rotor 3 rotates together with the drive shaft and the centrifugal weights 4, 5, are forced radially outwardly (see col. 2, lines 63-67). The drum that is not fixed to the drive shaft but is rotatable relative to the drive shaft is not rotating until a predetermined rotational speed of the drive shaft surpasses the no-load speed (col. 2, lines 59-60); at this time, the centrifugal weights 4, 5 engage the drum and cause the output shaft to rotate.

Examiner states that *Nickel et al.* shows coupling 4, 5 "forced against the drum by centrifugal force generated by rotation of the **output shaft** so as to engage the drum" (emphasis added). Examiner refers to col. 2, lines 59-68. According to col. 2, lines 52ff, the clutch drum 2 is seated on the drive shaft of the motor so as to permit relative rotation between clutch drum 2 and drive shaft, i.e., the drum is not fixedly mounted on the drive shaft and there is no drive pinion that drives that drum. However, the rotor 3 is fixedly fastened to the drive shaft (col. 2, lines 57-58) - not to the output shaft as stated by the examiner - so that, when the drive shaft rotates, the rotor 3 and the weights 4, 5 mounted thereon move radially outwardly to engage the drum 2. This is the typical design of a centrifugal clutch as it is commonly used in the art. The coupling 3, 4, 5 is therefore not forced against the drum by centrifugal force generated by the output shaft but is forced against the drum by the centrifugal force of the drive shaft of the motor.

If a centrifugal clutch as taught by *Nickel et al.* is used in the device of *UK 1,095,065*, according to the teaching of *Nickel et al.* the rotor and weights will be mounted on the drive shaft of the motor and the drum on the output shaft connected to

the tool. According to the present invention, however, the drum is drivingly connected to the drive shaft (driven by the drive pinion 7 connected to the drive shaft; claim 1) and the centrifugal coupling elements are connected to the output shaft (claim 1). Thus, the clutch of *Nickel et al.* used in a device of *UK 1,095,065* leads to an arrangement that is reverse to the arrangement claimed in claim 1.

It is not obvious to reverse the clutch of *Nickel et al.* when mounting it in a device of *UK 1,095,065*. The clutch is designed such that the weights 4, 5 will engage the drum only when a predetermined rotational speed has been reached (see col. 2, lines 59-63). When reversing the arrangement of *Nickel et al.*, i.e., when drivingly connecting the drum to the drive shaft of the engine and the fly bodies to the output shaft, the clutch would never engage because the weights connected to the output shaft will never be centrifugally acted on and will never be advanced against the drum. The weights 4, 5 require a certain centrifugal force caused by rotation of the shaft to which they are connected in order to be moved radially outwardly for engagement of the drum. There is no disclosure in regard to the output shaft generating a centrifugal force to move the coupling into engagement with the drum. There are no means for effecting a rotation of the output shaft that would cause the weights to move radially outwardly into engagement. The modification of *UK 1,095,065* with the centrifugal clutch of *Nickel et al.* as suggested by the examiner is, simply stated, inoperative.

Moreover, there is no suggestion whatsoever in the two cited references to attempt a reverse arrangement. The subject matter of the claim 1 is therefore not obvious in view of *UK 1,095,068* and *Nickel et al.*

Claim 4

According to claim 4, the portable device further comprises a pressing device that forces the coupling against the drum.

Examiner refers to the spring arrangement (dished spring 17) of *UK 1,095,068* that forces the coupling 14 against the drum 12. In this arrangement it is necessary to press the coupling (friction plate) 14 against the drum 12 in order to transmit the drive torque onto the tool. This pressing action is active at all times.

In an arrangement modified as suggested by the examiner, the coupling is

comprised of the centrifugal weights 4, 5 arranged on the drive shaft. If the concept disclosed in *UK 1,095,068* is applied to the centrifugal clutch of *Nickel et al.*, the weights 4, 5 are forced by a spring force against the drum to transmit the drive torque at all times - there is no longer a clutch or coupling that engages at a desired rotational speed.

In fact, this is contrary to the disclosure of *Nickel et al.* where springs 9, 10 are provided that keep the centrifugal weights 4, 5 away from the drum until the required rotational speed is reached (see col. 3, line 64, to col. 4, line 9).

Claim 4 is therefore not obvious in view of *UK 1,095,068* and *Nickel et al.*

Claim 8

According to claim 8, the portable device further comprises a pressing device, wherein the coupling is forced against the drum by the pressing device and the centrifugal force.

Examiner refers to the spring arrangement (dished spring 17) of *UK 1,095,068* that forces the coupling 14 against the drum 12. In arrangement according to *UK 1,095,068* it is necessary to press the coupling (friction plate) 14 against the drum 12 in order to transmit the drive torque onto the tool.

In an arrangement modified as suggested by the examiner, the coupling is comprised of the centrifugal weights 4 and 5 of *Nickel et al.* arranged on the drive shaft. If the concept disclosed in *UK 1,095,068* is applied to the centrifugal clutch of *Nickel et al.*, the weights are forced by a spring force against the drum to transmit the drive torque - there is no longer a clutch that engages at a desired rotational speed. In fact, this is contrary to the disclosure of *Nickel et al.* where springs 9, 10 are provided that keep the centrifugal weights away from the drum until the required rotational speed is reached (see col. 3, line 64, to col. 4, line 9).

Claim 8 is therefore not obvious in view of *UK 1,095,068* and *Nickel et al.*

Claim 14

According to claim 14, the coupling of the portable device comprises driving means that have a rotary surface interacting by friction with a rotary surface of the drum, wherein the driving means comprise a spring device forcing the rotary surface of

the driving means against the rotary surface of the drum.

Examiner refers to the friction plate and the spring arrangement of *UK 1,095,068* wherein the friction plate 14 has spring means (dished spring 17) that forces the friction plate 14 against the drum 12. In the arrangement according to *UK 1,095,068* it is necessary to press the coupling (friction plate) 14 against the drum 12 in order to transmit the drive torque onto the tool.

In an arrangement modified as suggested by the examiner, the coupling is comprised of the centrifugal weights 4 and 5 of *Nickel et al.* arranged on the drive shaft. If the concept disclosed in *UK 1,095,068* is applied to the centrifugal clutch of *Nickel et al.*, the weights 4, 5 are forced by a spring force against the drum to transmit the drive torque - there is no longer a clutch that engages at a desired rotational speed. In fact, this is contrary to the disclosure of *Nickel et al.* where springs 9, 10 are provided that keep the centrifugal weights away from the drum until the required rotational speed is reached (see col. 3, line 64, to col. 4, line 9).

Claim 14 is therefore not obvious in view of *UK 1,095,068* and *Nickel et al.*

Rejection of claims 18-20, 23, and 26 under 35 U.S.C. 103(a) over *Bidanset (US 3,982,616)*

Claim 18

Claim 18 defines an overload protection device for an electrically operated machine tool having an electric motor and a drive train for driving a tool, wherein the drive train comprises a gearbox. The overload protection device comprises a drum having a circumferential wall and at least one fly body engaging the circumferential wall of the drum. The drum and the at least one fly body are mounted in the drive train between the electric motor and the gearbox. The **drum is arranged at an input side of the drive train** and the at least one **fly body is arranged at an output side of the drive train**.

The examiner argues that *Bidanset* discloses an overload protection device with drive train for driving a tool such as a chain saw wherein the drive train comprises a gearbox and wherein the overload protection device comprises drum 5 with

circumferential wall and at least one fly body 6b, 11 engaging the circumferential wall. The drum 5 and at least one fly body are mounted in the drive train. The examiner further states that *Bidanset* discloses the claimed subject matter "except the drum (5) and the at least one fly body mounted in the drive train between the motor and the gearbox; wherein the drum is arranged at an input side of the drive train and the at least one fly body is arranged at an output side of the drive train". In examiner's opinion modification of the design of *Bidanset* is simply a matter of design choice since applicant has not disclosed that any stated problem is solved by the inventive arrangement.

Applicant disagrees: special advantages of the present invention are discussed in particular in Para 38 of the instant specification. Reference is further being had to the above detailed discussion of the special technical features of the present invention (SUMMARY OF THE CLAIMED SUBJECT MATTER). As set forth in Para 38, the arrangement of the overload protection device on the side of the motor has the effect that the overload protection device can be operated at a very high working rpm taking advantage of the square law between centrifugal force and rotary speed (rpm). The overload protection device with the flyweight can be designed to be very small and lightweight overall. In combination with a blocking device for the tool spindle of the tool machine, the overload protection device contributes to operational safety. For example, for a tool change the tool spindle can be blocked; when simultaneously the electric motor is started accidentally, only the drum at the side of the motor is rotated. The support member with the flyweight that is locked at the output side by the blocking device effects at most a minimal frictional connection with the drum. The motor is protected from damage, overheating and the like, by the inventive arrangement.

The actual function of the overload protection according to the invention occurs especially when the tool is blocked. The braking moment of the tool exerted onto the output shaft causes the fly bodies to slip relative to the drum and this causes the output shaft to stop. The fly bodies are no longer acted on by centrifugal force, but the motor can still drive motor shaft and drum. The elimination of centrifugal forces acting on the fly bodies leads to an **immediate decoupling without this requiring that the motor**

side and the drum must be braked or shut down.

A further advantage is the complete separation between the drive side and the driven side. When the operator starts the motor while the tool is blocked, the motor including the drum can rotate freely; the fly bodies are stopped because of the tool blockage and are not acted on by any centrifugal force. This arrangement therefore **causes no or only minimal frictional heat**. Overloading of the arrangement is prevented. This is not suggested or taught in the cited reference.

Bidanset (Fig. 4) discloses a centrifugal clutch that functions in a way well known in the art. The weights 6b, 11 are arranged on the motor side (input side) and rotated by the drive motor. The drum 5 is arranged on the driven side (output side or tool side). When the drive motor has reached a certain engine speed, the fly bodies 6b, 11 of the drive side frictionally engage the wall 5a of the coupling drum so that the sprocket 2 for driving the chain can be rotated. This is the basic principle of a centrifugal clutch as disclosed also in *Nickel et al.* discussed supra.

A reversal is not obvious as discussed above in connection with *Nickel et al.* because this would lead to an inoperable arrangement as the fly bodies are no longer acted on by a centrifugal force in order to force the fly bodies into engagement with the drum.

Moreover, the arrangement of *Bidanset* functions in a way that is completely different from the way the overload protection device of the present invention works. When the tool (saw chain) is blocked in the device of *Bidanset*, the sprocket 2 driving the chain and the coupling drum 5 must be braked. The fly bodies 6b, 11 remain however still engaged on the circumferential wall 5a of the coupling drum 5 and must also be braked. Since the fly bodies are connected to the drive shaft 1 at the motor side, the motor must be braked also. Blockage of the tool requires that the complete drive train, including the motor, must be braked. The arrangement requires the entire drive train to be slowed down until in the end the rotary speed of the motor shaft drops below coupling speed. This causes a significant loading of the entire drive train. Since all of the rotating masses must be braked, the braking process takes a long time and no instantaneous decoupling is possible.

A further disadvantage of the device of *Bidanset* is observed when the motor is still running even though the tool is braked or blocked. The drive motor continues to drive the fly bodies 6b, 11 so that, under the effect of centrifugal force, they rest against the wall 5a of the drum 5 and cause great friction leading to overheating and untimely wear.

An important feature of the present invention resides in that the drum is arranged on the drive side (motor side) while the coupling bodies (fly bodies) are positioned on the driven side (tool side). Only this type of arrangement enables an **immediate and delay-free decoupling action** when the tool is blocked and a subsequent permanent decoupling (while the motor is still running!), thus preventing overload. This is not proposed or suggested by *Bidanset.*

Claim 18 is therefore not obvious in view of *Bidanset.*

Claim 19

Claim 19 defines that the overload protection device also comprises means for statically pressing the at least one fly body against the circumferential wall of the drum.

The examiner states that this feature is disclosed in *Bidanset* by the means 11 for statically pressing the at least one fly body against the wall of the drum.

According to the disclosure of *Bidanset*, the part 11 is an auxiliary weight or shoe that is positioned in a recess of the shoe portion 6b. As disclosed in col. 3, lines 20-35, the auxiliary weight or shoe 11 is freely moveable in the recess 10 in the radial direction and pressed against the drum by **centrifugal force** (see lines 28-35 of col. 3) when the engine drive shaft is running at idle speed. When the drive shaft is stopped, the freely moveable shoes 11 are no longer in engagement with the drum. When the drive shaft rotates at more than idle speed, the shoe portions 6b are centrifugally pressed against the drum and the shoes 11 are fully received in the recess 10 and form a continuous surface with the shoe portions 6b (see col. 3, lines 44-55) so as not to interfere with engagement of the drum by the shoe portion 6b. Therefore, the shoes 11 are no means for **statically pressing** the fly bodies against the drum. They cannot force the shoe portions 6b against the drum as they are moveable relative to the shoe portions 6b. Since they are moveable within the recesses 10, they cannot apply a pressing force on

the shoe portions 6b.

Therefore, claim 19 is not obvious in view of *Bidanset*.

Claim 20

According to claim 20, the overload protection device is arranged in the machine tool such that an axis of rotation of the overload protection device relative to a working position of the machine tool is substantially in a horizontal position and the at least one fly body is forced by gravity against the circumferential wall.

The examiner argues that *Bidanset* shows the overload protection device to be arranged in the machine tool in Fig. 3 in such a way that the drum is engaged and at least one fly body is forced by gravity against the circumferential wall.

Appellant respectfully disagrees. Fig. 3 may show the overload protection device in such a position that the axis of rotation is horizontal but Fig. 3 does not show that the fly body is forced by gravity against the circumferential wall. First of all, the bottom portion of the overload protection device is covered so that it is not shown where the shoe portion (fly body) 6b is located. Moreover, Fig. 3 shows the coupling in the engaged position under normal operating conditions, i.e., the drive motor is running and the centrifugal forces have caused the coupling to engage; see col. 2, lines 23 to 34, where it is stated that Fig. 1 shows the coupling engaged in normal operating condition and that Fig. 3 is a section of Fig. 1, i.e. the coupling is shown in the engaged position. It is therefore not possible that a gravity-caused contact between the fly body and the circumferential wall of the drum is shown. Moreover, the configuration of the fly bodies 6a, 6b, 6c is such that the shoe portion 6b is connected by spring 6c to the hub portion 6a (see col. 3, lines 4-6). It is stated that the coupling does not engage until the speed of the shaft 1 exceeds a selected value at which time the shoe portions 6b are pressed by centrifugal force against the wall of the drum (col. 3, lines 13-19). The spring arms 6c prevent any contact between the shoe portion 6b and the drum wall until the centrifugal force overcomes the spring force.

Claim 20 is therefore not obvious in view of *Bidanset*.

Claim 23

In the overload protection device according to claim 23 the at least one fly body

has a first end that is pivotably supported and has a second free end that is provided with positive-locking guide means.

The examiner refers to elements 11 as positive locking guide means. It is respectfully submitted that the elements 11 are means that cause a frictional engagement of the drum wall when they are centrifugally forced radially outwardly. Frictional engagment is not a positive-locking engagement.

Claim 23 is therefore not obvious in view of *Bidanset*.

Claim 26

Claim 26 relates to an electrically driven machine tool having an overload protection device as claimed in claim 18.

Reference is being had to the discussion above in regard to the features of the overload protection device of claim 18. As set forth above the overload protection device is not obvious in view of *Bidanset* and the claimed machine tool provided with an overload protection device of claim 18 is therefore also not obvious.

Rejection of claim 24 under 35 U.S.C. 103(a) over *Bidanset (US 3,982,616)* in view of *Shultz (US,5,503,261)*

Claim 24 relates to an electrically driven machine tool having an overload protection device as claimed in claim 18.

Claim 24 depends from claims 18 and 23. Reference is being had to the discussion above in regard to the features of the overload protection device of claim 18 relative to the disclosure of *Bidanset*. Reference is being had to the discussion above in regard to the features of at least one fly body with first end pivotably supported and second free end provided with positive-locking guide means, as set forth in claim 23, relative to the disclosure of *Bidanset*. As argued supra, the overload protection device of claim 18 is not obvious in view of *Bidanset* and the elements 11 of *Bidanset* are no positive locking guide means as claimed in claim 23 but cause frictional engagement. The reference *Shultz* teaches a hinge bearing supporting a fly body but does not provide teachings in regard to the features of claims 18 and 23 that are not disclosed in or taught by *Bidanset*. Claim 24 is therefore not obvious in view of *Bidanset* and *Shultz*.